



# Objectives

- **To understand that epidemiology studies the determinants of health**
- **To realize the importance of health determinants to individual and population health outcomes**
- **To address the relationship between health status and biology, individual behavior, health services, social factors, and policies**
- **To emphasize an ecologic approach to disease prevention and health promotion that focuses on both individual and population-level determinants of health and interventions**





# The Importance of Health Determinants to the Health of the Population

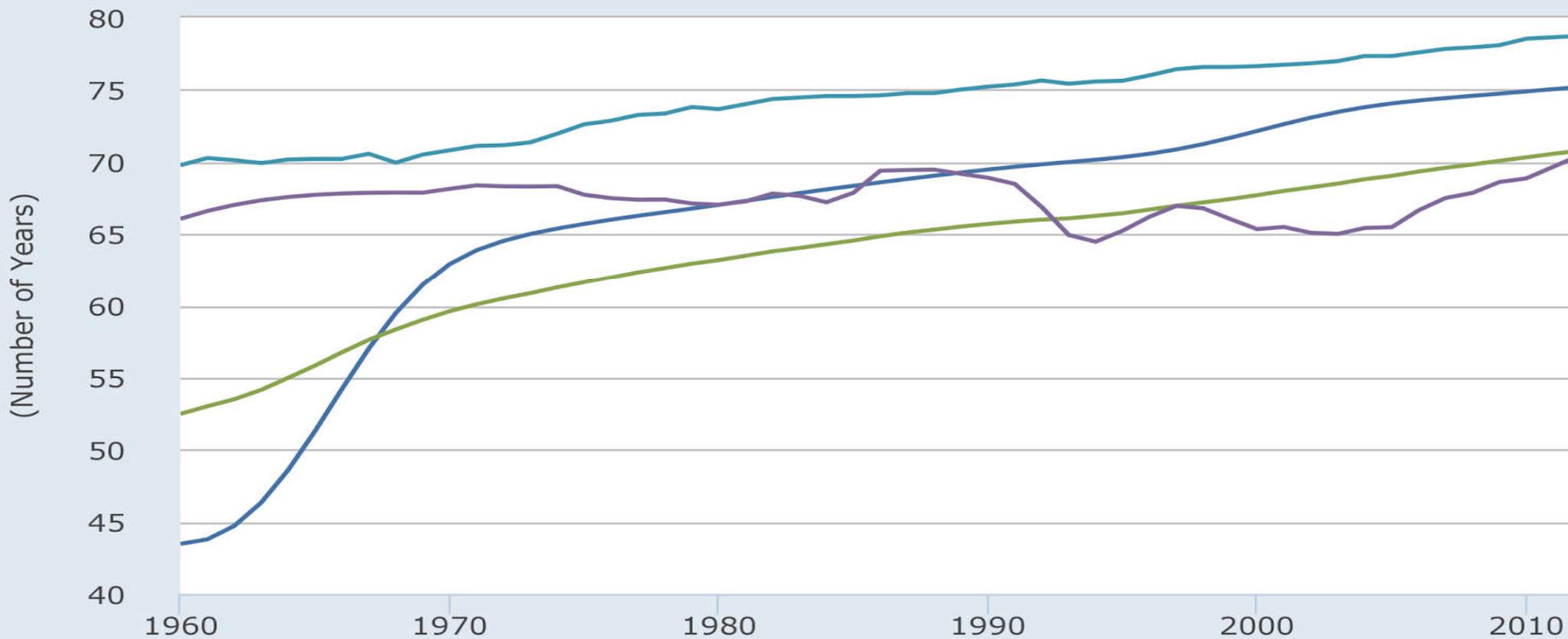
1. “Common diseases have roots in lifestyle, social factors and environment, and successful health promotion depends upon a population-based strategy of prevention.”
2. As health professionals, training and reimbursement systems emphasize diagnostic and treatment services to individuals.
3. We need to focus on those factors (DETERMINANTS) which have the most influence on the health of the population.



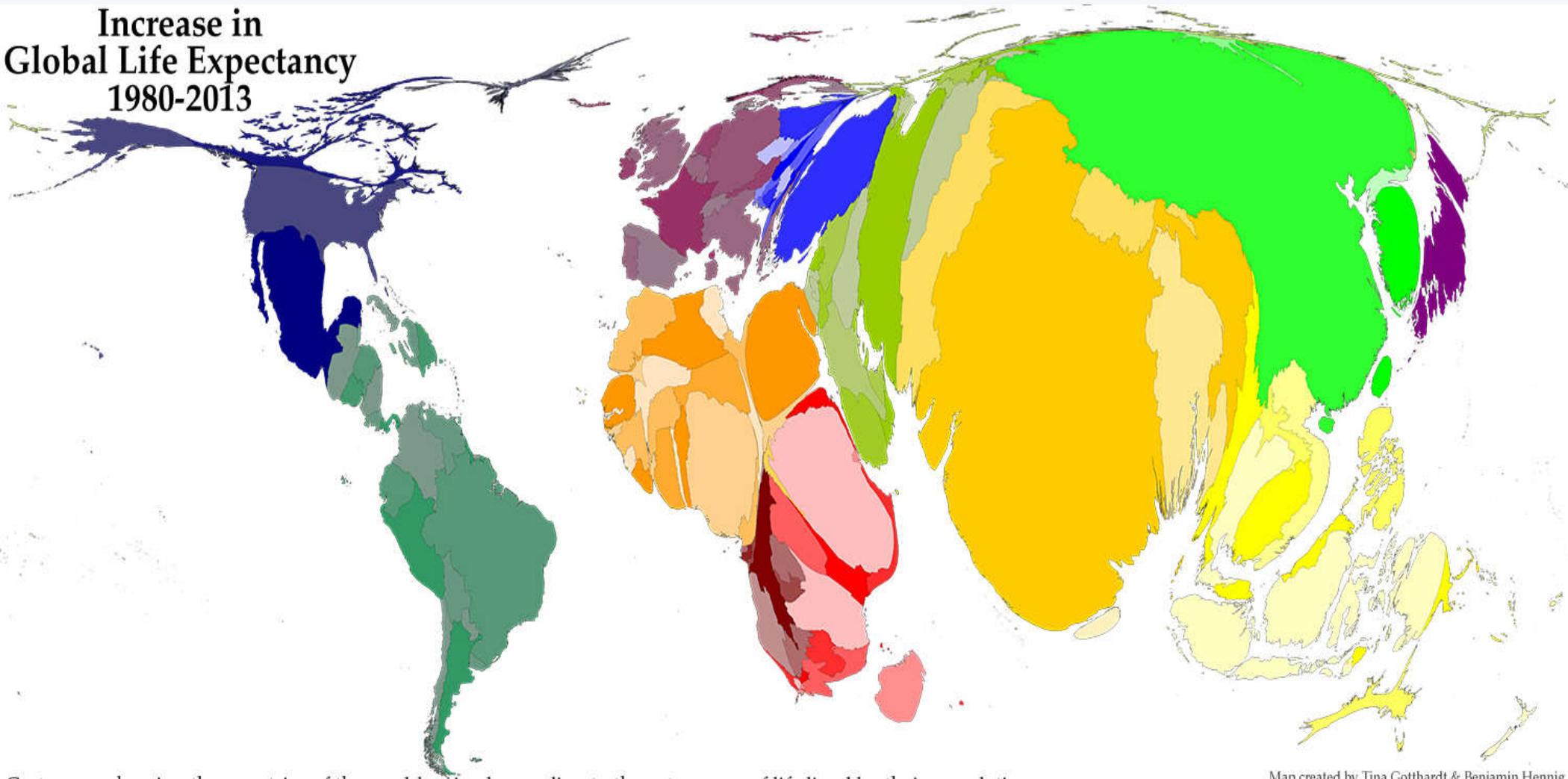
Life Expectancy in Years by Country at Birth (2009 est.)

	Japan	82.12		Norway	79.95
	Singapore	81.98		Greece	79.66
	Australia	81.63		Austria	79.50
	Canada	81.23		Netherlands	79.40
	France	80.98		Germany	79.26
	Sweden	80.86		Belgium	79.22
	Switzerland	80.85		United Kingdom	79.01
	Israel	80.73		Finland	78.97
	New Zealand	80.36		Denmark	78.30
	Italy	80.20		Ireland	78.24
	Spain	80.05		United States	78.11

- Life Expectancy at Birth, Total for China
- Life Expectancy at Birth, Total for the World
- Life Expectancy at Birth, Total for the Russian Federation
- Life Expectancy at Birth, Total for the United States



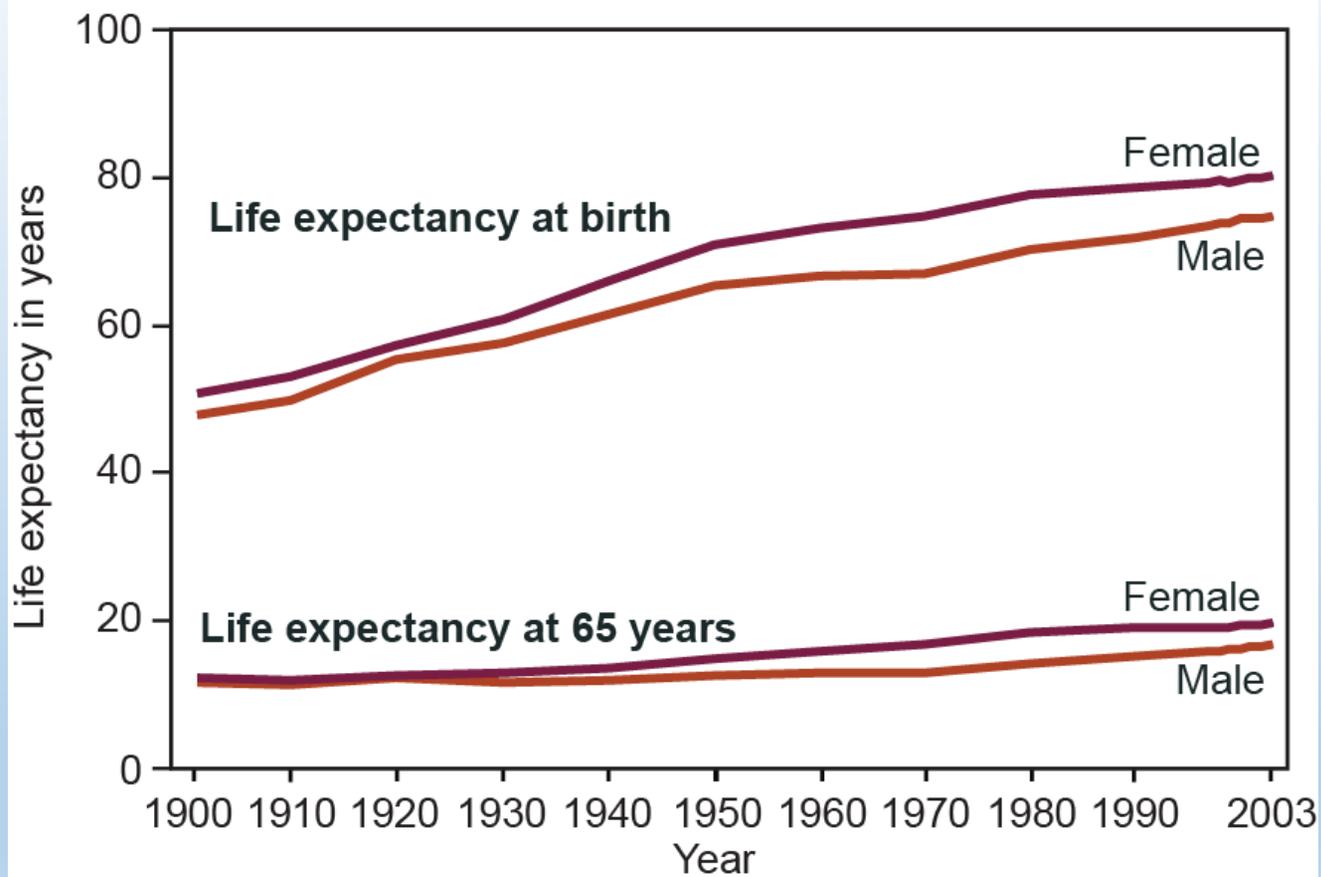
# Increase in Global Life Expectancy 1980-2013



Cartogram showing the countries of the world resized according to the extra years of life lived by their population through increases in life expectancy between 1980 and 2013

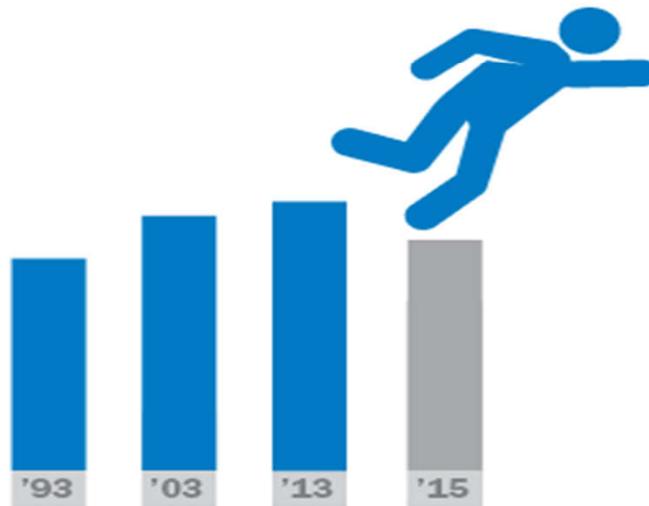
Map created by Tina Gotthardt & Benjamin Hennig  
Data Source: UN Human Development Report 2014  
[www.viewsoftheworld.net](http://www.viewsoftheworld.net)

## Life expectancy



SOURCES: Centers for Disease Control and Prevention, National Center for Health Statistics, *Health, United States, 2006*, Figure 24. Data from the National Vital Statistics System.

For the first time since 1993, **U.S. life expectancy has declined**, while **other countries are still improving**. It's up to all of us to start moving in the right direction.



# What is Health Equity?

- Health equity is the availability of health care while taking in to account the other factors that influence health such as employment, housing, transportation, education, socioeconomic status, food access, etc.
- When health equity is achieved, no one is excluded because of a pre-existing health condition or external circumstances. Health equity acknowledges that everyone does not start from the same place or needs the same things.



# HP 2020 Definition of Health Equity

Healthy People 2020 defines *health equity* as the “attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and healthcare disparities.”



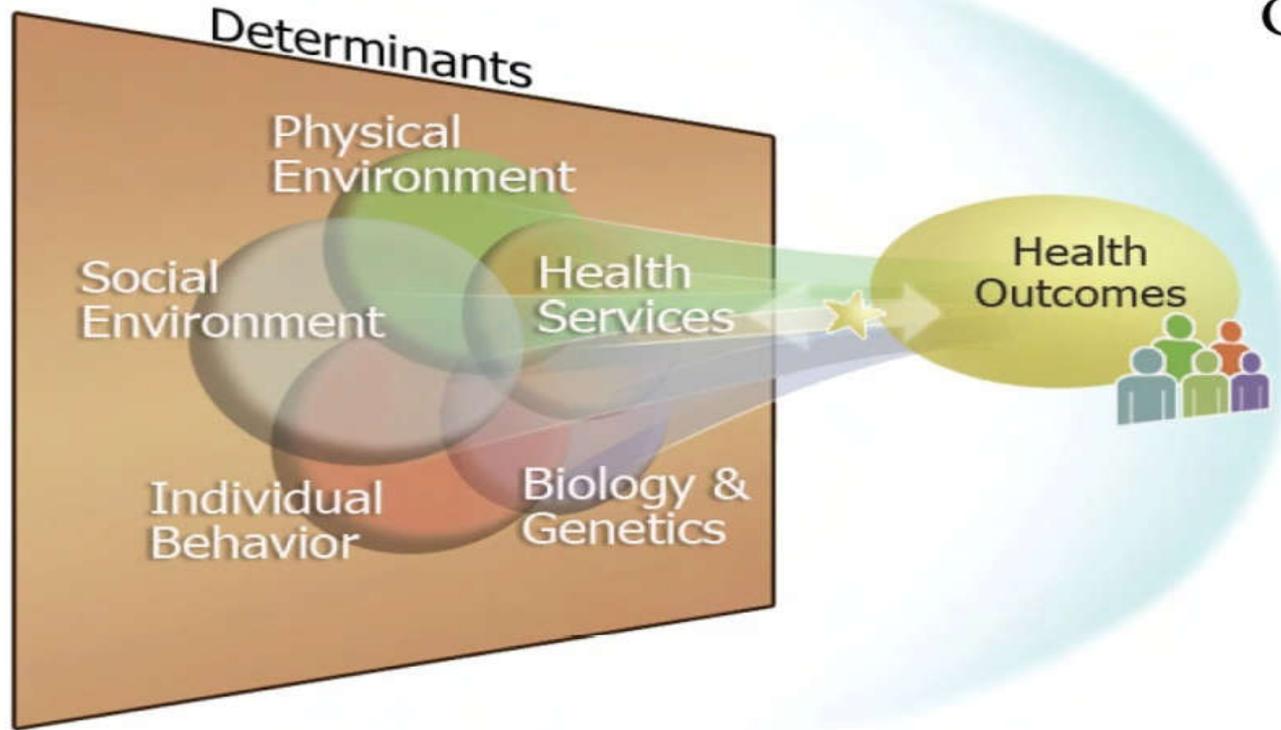
## **In an equitable society, everyone has the opportunity to:**

- Complete the education level desired**
- Obtain employment needed to support themselves and their families**
- Find food that sustains health**
- Live in safe housing**
- Breathe clean air and drink clean water**
- Participate in making decisions that affect their well-being**



# Healthy People 2020

*A society in which all people live long, healthy lives*



## Overarching Goals:

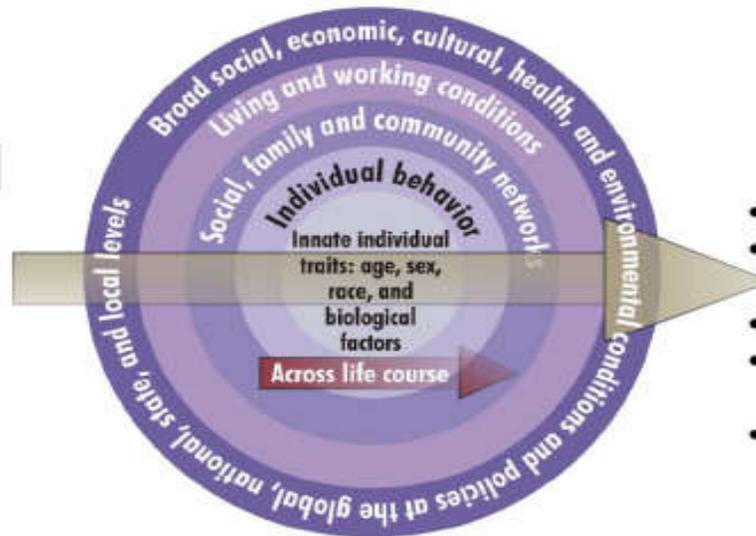
- Attain high quality, longer lives free of preventable disease, disability, injury, and premature death.
- Achieve health equity, eliminate disparities, and improve the health of all groups
- Create social and physical environments that promote good health for all.
- Promote quality of life, healthy development and healthy behaviors across all life stages.

## Action Model to Achieve Healthy People 2020 Overarching Goals

### Determinants of Health

### Interventions

- Policies
- Programs
- Information



### Outcomes

- Behavioral outcomes
- Specific risk factors, diseases, and conditions
- Injuries
- Well-being and health-related Quality of Life
- Health equity

### Assessment, Monitoring, Evaluation & Dissemination

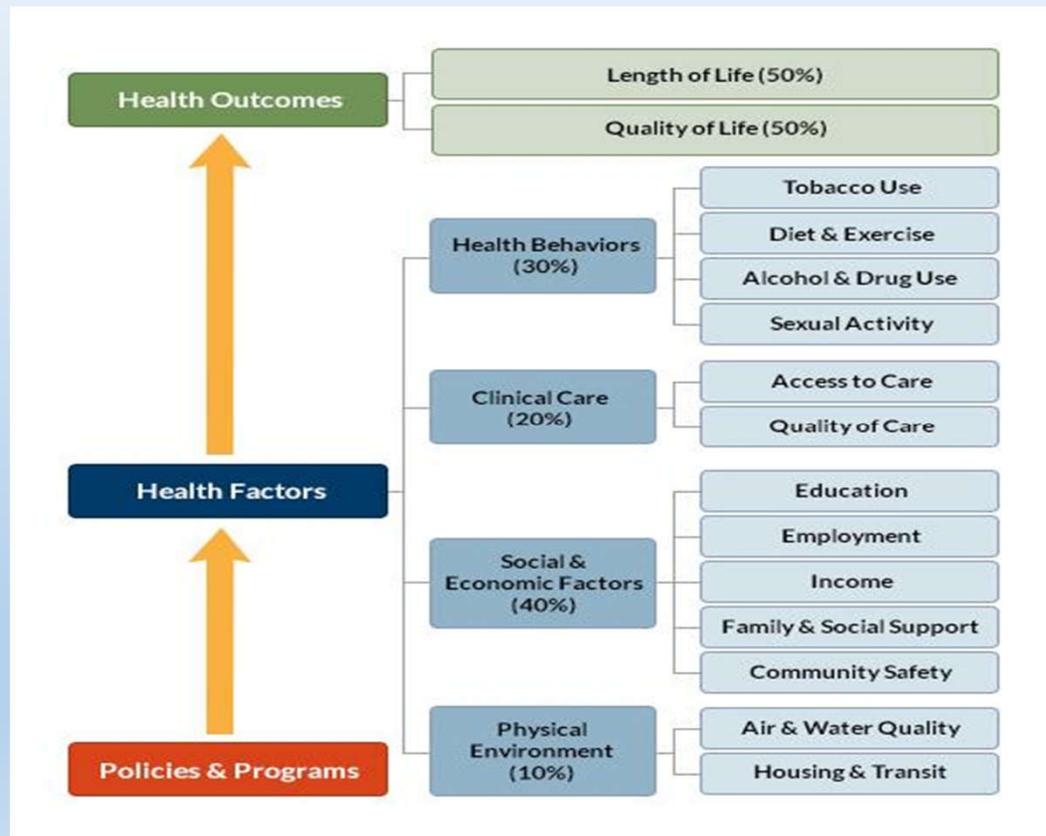


# HP 2020 Determinants of Health

- **Policymaking**
- **Biology and Genetics**
- **Health Services**
- **Individual Behavior**
- **Social/(Physical) Factors**



# County Health Rankings Model



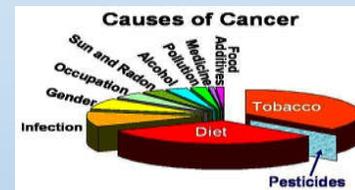
# Interrelationships Between Health Determinants

- Interrelations between these factors determine individual and population health.
- Interventions that target multiple determinants are more likely successful.
- Note: Determinants reach beyond traditional healthcare and public health sectors ►
  - Education, housing, transportation, agriculture, and environmental are sectors important in improving population health.



# Interrelationships Between Health Determinants Example

- Cancer causation is a good example of this interrelationship.
- Depending on the type of cancer, studies have shown that DNA mutations may account for a majority of cancer cases.
- About 5% of cancer-causing mutations are linked to inherited genes:
  - e.g., Prostate and Eye >Biology & Genetics
- About 69% are due to random errors during cell division
  - e.g., Pancreatic cancer > Biology & Genetics determinant
- About 29% are related to modifiable environmental factors
  - Wearing sun block > Individual Behavior determinant
  - HPV vaccine > Health Services
  - Environmental toxicants > Social/physical environment







# Health Services as a Health Determinant

Lack or limited access to health services and the quality of health services can impact health:

► **Barriers to accessing health services:**

-Lack of availability

-High cost

-Lack of insurance coverage → ↓ preventive care, delayed treatment

-Limited language access

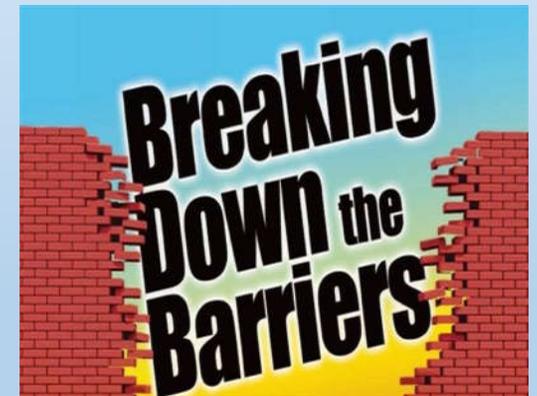


# Health Services as a Health Determinant (2)

Lack or limited access to health services and the quality of health services can impact health:

► Barriers may lead to:

- Unmet health needs
- Delays in receiving appropriate care
- Inability to receive preventive services
- Preventable hospitalizations



# Individual Behavior as a Health Determinant

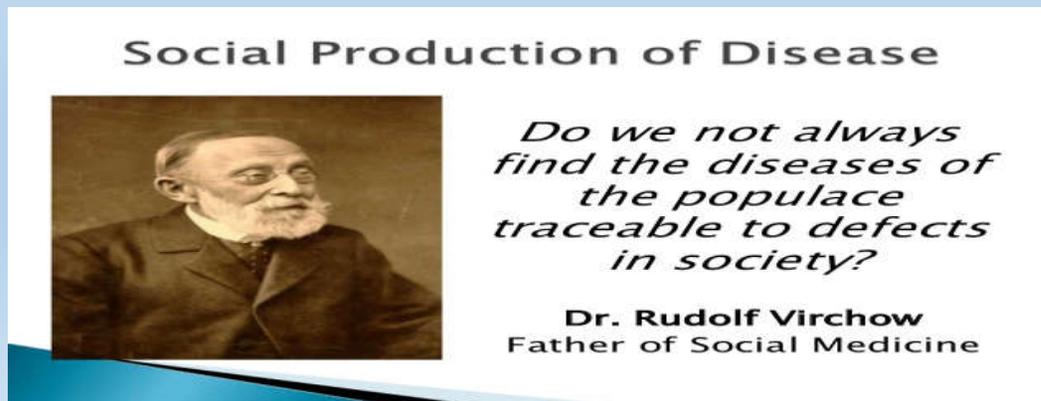
Individual behaviors (aka lifestyle choices) play a significant role in an individual's health status:

- Dietary patterns
- Level of physical activity
- Alcohol, tobacco, and other drug use
- Hand washing behavior
- Sexual behavior
- Inadequate relief of chronic stress
- Use of sun block



# Social Factors as Health Determinants

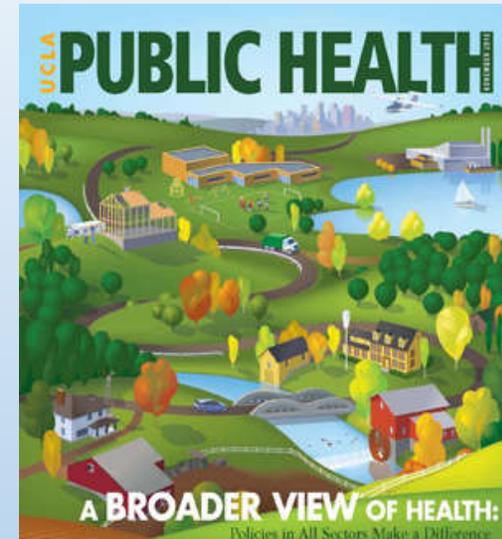
- **Social determinants of health reflect the social, personal, and economic factors and physical conditions of the environment in which people are born, live, learn, play, work, worship, and age.**
- **These are also known as social/physical determinants of health and impact a wide range of health, functioning, and quality-of-life outcomes.**





# Examples of Social/Physical Determinants

- **Natural environment: plants, weather, or climate change**
- **Built environment: buildings or transportation, road trauma**
- **Worksites, schools, and recreational settings**
- **Housing, homes, and neighborhoods including homelessness**
- **Exposure to toxic substances, physical hazards, infectious agents, noises, odors**
- **Physical barriers especially for people with disabilities**
- **Aesthetic elements: good lighting, trees, or benches**



# Why Social Determinants Are So Important?

- People with a quality education, stable employment, safe homes and neighborhoods, and access to preventive services tend to be healthier throughout their lives.
- Conversely, poor health outcomes are often made worse by the interaction between individuals and their social and physical environment.
  - ▶ Millions of people in the United States live in places that have unhealthy levels of ozone or other air pollutants. In counties where ozone pollution is high, there is often a higher prevalence of asthma in both adults and children compared with state and national averages. Poor air quality can worsen asthma symptoms, especially in children. It increases heart disease and contributes to premature deliveries.



# More Health Impacts of Social Determinants

- Discrimination, stigma, or unfair treatment in the workplace can have a profound impact on health: discrimination can increase blood pressure, heart rate, and stress as well as undermine self-esteem and self-efficacy.
- Family and community rejection, including bullying of lesbian, gay, bisexual, and transgender youth, can have serious and long-term health impacts including depression, use of illegal drugs, and suicidal behavior.
- Places where people live and eat affect their diet. More than 23 million people, including 6.5 million children, live in “food deserts” —neighborhoods that lack access to stores where affordable, healthy food is readily available (such as full-service supermarkets and grocery stores).



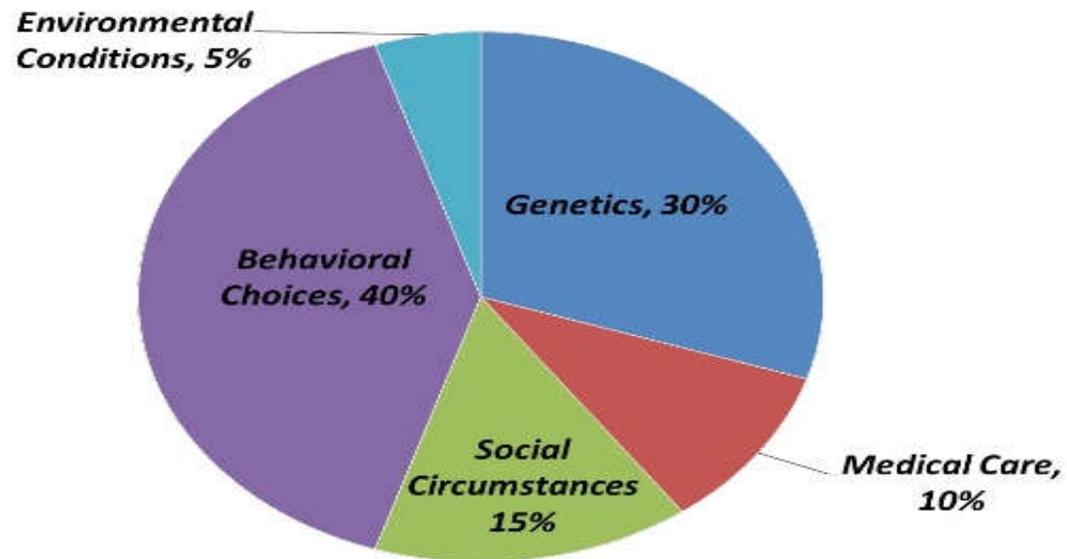
# So then, what is the most important health determinant?

- Well, as a lawyer would say, “it depends”.
- “Assessments of the relative importance of different determinants depend critically on the health variation to be explained.”
- Statements assessing causation responsibility for a health matter may or may not be correct “depending” on the “completeness” of the assessment.
- It may be difficult assigning per cent responsibility for outcome by an individual determinant.
- Multiple factors contribute, independently and synergistically, so total probably >100%

**IT DEPENDS.**

THE ANSWER TO EVERY QUESTION EVER  
POSED IN LAW SCHOOL.

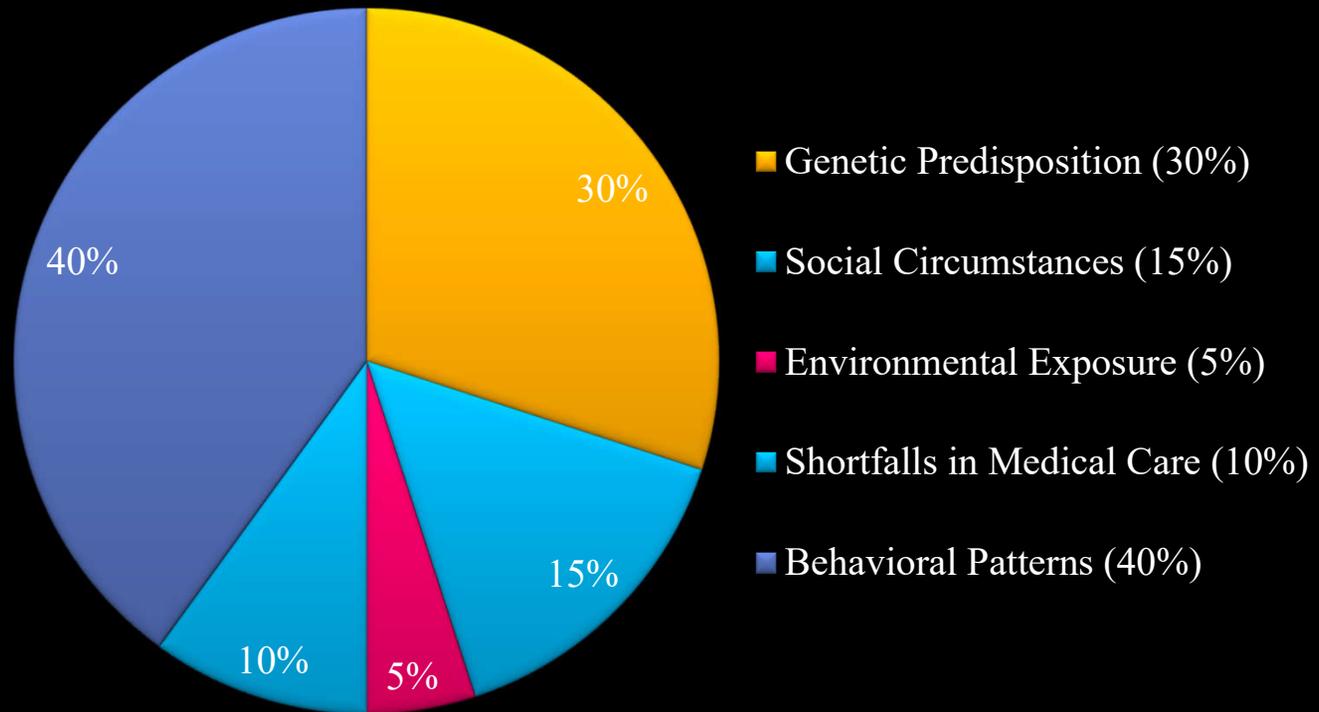
# Factors Influencing Health



McGinnis et al, Health Affairs, Vol 22 (2)



## Impacts of Various Domains on Early Deaths in the United States



Adapted from McGinnis JM, Williams-Russo P, Knichman JR.  
The case for more active policy attention to health promotion.  
Health Aff (Millwood) 2002;21(2):78-93.



# Health Determinants Example

- **Why does the Pima Tribe of Arizona have Type 2 diabetes rates of up to 50% in the population?**
- **Possible explanations include:**
  1. **Policy determinants**: Gila River dammed in 1890's by Federal government affected agriculture supply and a previously physically demanding lifestyle.
  2. **Biological/genetic determinants**: Genetically similar cousins in Mexico not as affected but Pima genetically prone to diabetes. Possible "thrifty" gene effect?
  3. **Health services determinants**: Some Indian Health Service clinics available.
  4. **Individual behavior determinants**: Increased caloric diets due to government-provided unhealthy food; decreased physical activity due to restricted agriculture/unemployment; increased alcohol and tobacco use due to social issues (un/under employment).
  5. **Social determinants**: Diversion of water limited type/amounts of agriculture so tribe lived on subsidized food.



# Health Determinants Example

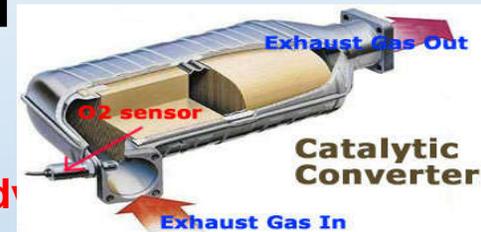
- Why was there a sharp increase in the life expectancy in the United States during World War II (1941- 45)?
- Possible explanations include:
  1. Policy determinants: no significant changes in that interval
  2. Biological/genetic determinants: however, significant biological/genetic changes were unlikely to have occurred over such a small period of time.
  3. Health services determinants: however, there were no significant technological advances and many healthcare practitioners were at war.
  4. Individual behavior determinants: possible decreased caloric diets due to food rationing; possible increased physical activity due to gas rationing; possible decreased alcohol and tobacco due to shortages
  5. Social determinants: increases in income due to war; decreases in unemployment; and, morale improvements by working towards a common goal.





# Health Determinants Example

- Why was there a rapid decline in cardiovascular and cerebrovascular mortality between 1970 and 1980?
- Possible explanations include:
  1. Policy determinants: Public Health Cigarette Smoking Act banning advertising took effect on January 2, 1971; Clean Air Act of 1970 limited emission from stationary industrial and mobile sources; EPA required catalytic converter by 1975
  2. Biological/genetic determinants: too short an interval for changes
  3. Health services determinants: probably more aggressive and effective control of blood pressure
  4. Individual behavior determinants: decreases in smoking among men, but smoking did not decrease with women who still had a decrease in mortality
  5. Social determinants: less toxins in the physical environment & catalytic converters on cars reduced emissions due to policy determinants





# Health Determinants Example

- Why do Mexican Americans have an IMR slightly less than non-Hispanic whites?

- Possible explanations include:

1. Policy determinants: unlikely

2. Biological/genetic determinants:

**more likely explanation for still unknown reasons**

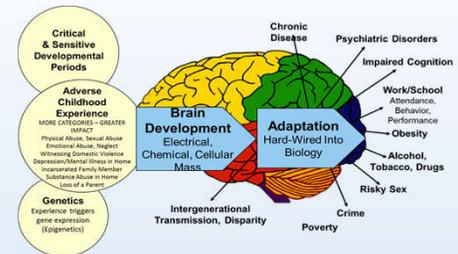
3. Health services determinants: unlikely that they have better care and more likely that they have less access to health insurance

4. Individual behavior determinants: unlikely as obesity rates are higher in this population; **may have less stress due to bonding?**

5. Social determinants: social conditions are probably worse as reflected in income and educational attainment **but may have more social bonding due to culture**



# Health Determinants Example



- In the developed world, why are Adverse Childhood Experiences (ACEs) felt to be the most important health risk indicator and tied to early developmental problems and adult health issues?
- Possible explanations include:
  1. Policy determinants: Lack of Trauma-Informed Care Learning Communities
  2. Biological/genetic determinants: Stress causes secretion of adrenalin, etc. leading to physiological changes promoting health problems such as heart disease, obesity, etc.; Experience triggers gene expression (epigenetics)
  3. Health services determinants: Lack of availability of community interventions including counselling from infant to adult ages.
  4. Individual behavior determinants: Parental drug abuse; Parental sexual behavior
  5. Social determinants: Parental/guardian abuse (sexual, physical, psychological); Domestic violence on parent/child; Imprisoned family member(s); Parental divorce/separation



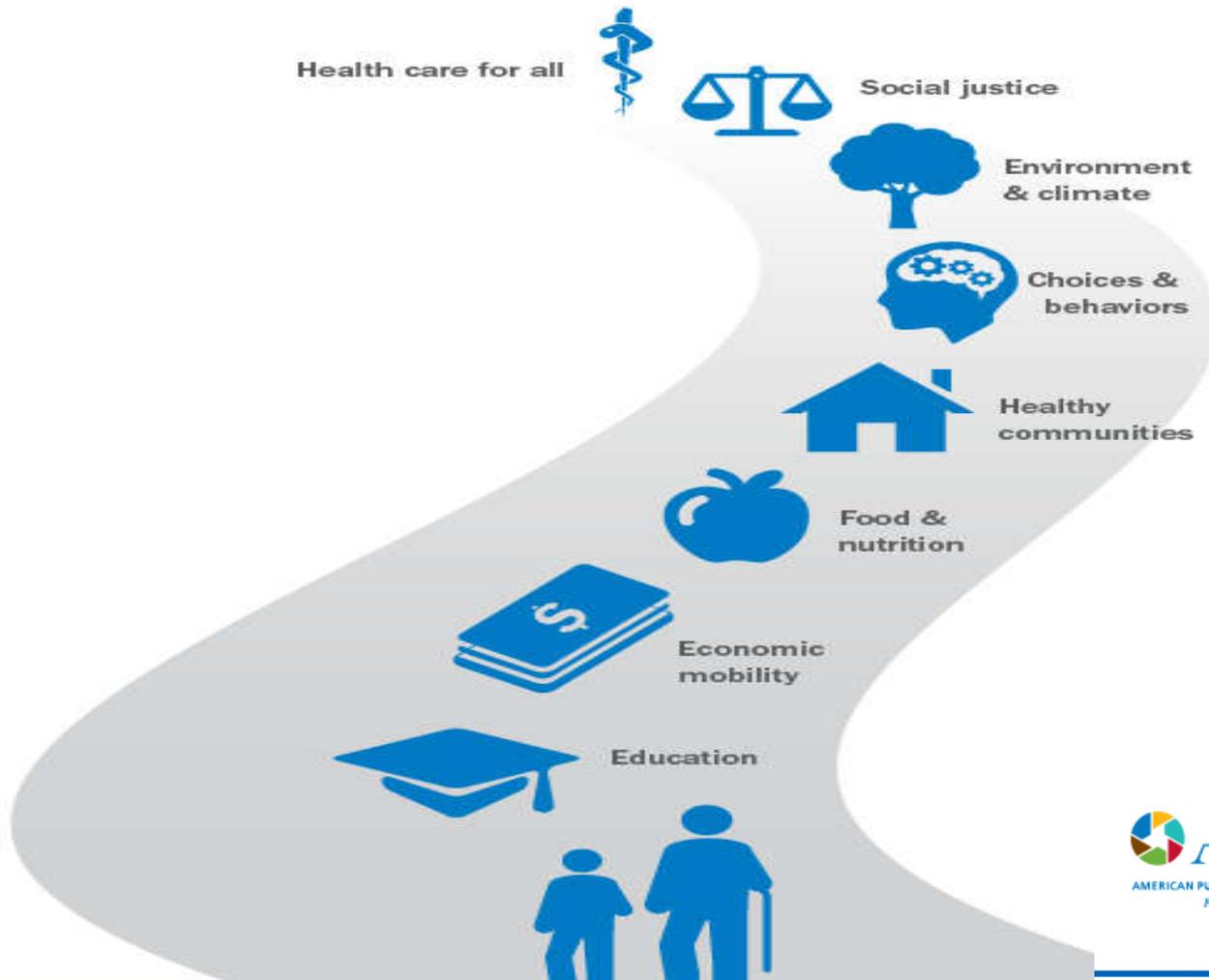


## Health Determinants Example



- Why do Amish children have asthma prevalence just 25% that of Hutterite children?
- Possible explanations include:
  1. **Policy determinants**: Amish use traditional farming methods while Hutterites use motor vehicles and advanced farm technology.
  2. **Biological/genetic determinants**: Both are genetically similar populations. Amish more exposed to allergens and non-pathogenic organisms that stimulates their innate immune system.
  3. **Health Services determinants**: No significant differences.
  4. **Individual behavior determinants**: Due to population policies, Amish lifestyle provides increased exposure to the microbial products in farm environment.
  5. **Social determinants**: Amish children have more direct contact with their ambient environment.

Our health is affected by more than just health care.  
As we **move toward prevention**, we can achieve **health for all**.



**Prevention** is everyone's job. It takes the **entire community** to address the **social, environmental** and **behavioral factors** that **impact our health**. Here's how **we can work together**.



#### **EDUCATION SYSTEM**

- Promote school-based health centers
- Support free and reduced-price meal programs



#### **COMMUNITY PLANNING**

- Create safe, walkable, rollable, drivable, accessible communities
- Promote safe, affordable mixed-use housing with access to transportation and services



#### **FAITH-BASED ORGANIZATIONS**

- Educate and offer opportunities for healthy choices and behaviors within congregations
- Provide disaster relief, cooling stations and alternative emergency shelter services



#### **BUSINESS COMMUNITY**

- Promote a living wage
- Support universal paid family leave and sick days



#### **JUSTICE SYSTEM**

- Encourage mental health sensitivity and support community policing strategies
- Offer violence prevention efforts and common-sense gun safety regulations

# Summary



- **Our health is determined by more than the availability of healthcare.**
- **Cross-sectional variations in health outcomes are usually best explained by the social and individual behavior determinants of health.**
- **Variations in health outcomes over time (e.g., increased life expectancy) is best explained by advances in medical sciences and technology (health services determinants) and improvements in the physical environment (social determinants).**
- **The relative importance of different determinants in affecting health depends on the variation in health to be explained.**

# Questions?

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